The Summer Undergraduate Research Fellowship (SURF) Symposium
4 August 2016
Purdue University, West Lafayette, Indiana, USA

Real-Time Temperature and Heat Flux Measurements for Lyophilization Process Design and Monitoring: Part 2

Nicholas J. Huls[1], Evan T. Liechty[1], Andrew D. Strongrich[2], Alina A. Alexeenko[2]
[1]Department of Chemical Engineering, Purdue University
[2]Department of Aeronautical and Astronautical Engineering, Purdue University

ABSTRACT

Lyophilization is a sublimation drying process that is often used in the pharmaceutical and food industry to make products more stable and increase shelf life [1]. The lyophilization process is very temperature and pressure sensitive so close monitoring is required to ensure the final product quality. New wireless temperature sensors are designed to monitor the product's temperature *in situ* effectively to ensure cake stability. The sensors were tested in Wheaton 6R vials simultaneously with the wired thermocouples using solutions of 5% w/v sucrose in ultra-pure water. The data collected from each of the experiments were used to model the heat flux through the vials. We intend to compare the experimentally determined data with results produced by the numerical model, in order to gauge the accuracy of the numerical model. We also aim to evaluate whether the wireless temperature sensors can accurately and reliably monitor the product temperature and develop approaches for sensor applications in lyophilization process research.

KEYWORDS

Wireless Temperature Sensors, Lyophilization, Heat Flux

REFERENCES

[1] Fetterolf, David M. "Lyophilization." *Journal of GXP Compliance,* 14, no. 4 (August 2010): 52-60.